Chapter Twenty-Two

CADD File Development and Standards

MONTANA RIGHT-OF-WAY
DESIGN MANUAL

Chapter Twenty-Two
CADD FILE DEVELOPMENT AND STANDARDS

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OVERVIEW OF 800 ACTIVITIES

22-1 BUILDING CADD FILES

The ***CADD Standards Manual*** must be utilized throughout the design process. It can be found electronically at "W:\Documentation\CADD_Standards."

A Contract Plans Book (CPB) will need to be created for the design files comprising the R/W plan set. Instructions for creating a CPB can be found in the ***Docuplot Users Manual*** located at "W:\Documentation\Docuplot_Users_Manual."

Note: It's always advisable to consult Right-of-Way prior to printing, given there may be revisions in progress.

MDT does anticipate converting from metric to English design units resulting in possible file development changes. This conversion may alter the following procedures.

22-1.1 Building MicroStation V8 Files With Macro

With the introduction of MicroStation V8, macros were developed to create all r/w design CADD files except parcel exhibit files. This is a valuable time saving method to creating r/w files; however, files can still be created manually. There may be an occasion when the macros will not work on a particular project or you choose to build the files manually.

Before you begin, make certain the road design title sheet, strip map and all plan and profile files are located on your "c:\dgn" and they are in MicroStation V8 format. Perform the following steps:

1. Within any MicroStation V8 CADD file, start the macro by choosing "MDT, ROW Design".

2. Create a .DAT file to contain project specific information by choosing the project information folder icon. Fill in the appropriate project information and save the file. This file can be added to DMS for use in easily updating project information in the plan sheet files.

3. To create the r/w CADD files, select the “Create DGN(S)” option and fill in all applicable information for the files to be created.

4. The title, ownership, plan and exhibit sheets need to be labeled with the project information by selecting the “Sheet” option, then “Sheet Labeler”.

22-1.2 Building MicroStation V8 Files Manually

This process is utilized to ensure that all parameters for building the road design files are compatible with those used for the r/w files. Both road design and r/w files are referenced with each other; therefore, it is important that they are built the same.

22-1.2.1 Strip Map

Create the strip map using the following procedures:

1. Save the road design strip map file as a r/w strip map file following the standard naming convention: “_ _ _ _ROMAP001.dgn”.

2. Open your renamed file in MicroStation.

3. Delete all the active elements in the file.

   You can use the “Fence Delete” command or “Select All” from the “Edit” menu then delete.

4. Reference the road design strip map file back in. Use logical name “rdmap1”. Attach any additional strip map files as needed such as photogrammenty/survey files, etc.

5. Begin placement of found and unfound section lines, existing r/w & easement lines, existing found property pins and monuments, railroad r/w lines, property lines, county road easements, etc. in this file as necessary information becomes available. Refer to Chapter 23 — Preliminary Plan Preparation.

6. Set up the file as desired. Compress file and save settings.

7. Send file to DMS (Document Management System).

22-1.2.2 Plan Sheets

Create plan sheets using the following procedures:

1. Save the road design plan sheet file as a r/w plan sheet file following the standard naming convention: "_ _ _ _ROPLN001.dgn".

2. Open your renamed file in MicroStation.

3. Delete all the active elements in the file. You can use the "Fence Delete" command or "Select All" from the "Edit" menu then delete.

4. Reference the road design plan sheet file back in for each sheet matrix used. Use logical names "rdpln1", "rdpln2", "rdpln3".

5. In the "Reference Files" window, "Display", "Snap", & "Locate" should be on for every reference file. Change the logical name of the road design sheet reference file from "sht" to "sht1".

6. Attach the r/w standard sheet border "MTROSTD:METRWPL.REF". Use logical name "sht". If this reference file does not reference in the appropriate area, you may have to move and perhaps scale the reference file to appear correctly.

7. Place a fence around all sheet borders to be used. Clip bind reference files "sht" and "sht1" to trim extra information from view: "Tools", "Clip Boundary".

8. All levels need to be turned off except levels 1, 2 & 3 in the "sht1" "MTRDSTD:planm.ref" reference file.

9. Detach any profile files: "Tools", "Detach". This is a good time to clean up the reference files. You may identify duplicate or unnecessary reference files and/or want to revise logical names.

10. Particular reference files need to be moved to the center of the r/w plan sheets. They can be moved individually or all at once. Necessary files include road design plan files and all strip map files such as road design, photogrammetry, survey, traffic, etc. Choose the desired files from the "Reference File" window, select the "Tools", "Move" command, then type "DL=0,-140" in the command window and "Enter".

11. Attach the plan sheet data field cell "mtpldf" from the "RWMET.CEL" library and fill in as much information as possible in the data fields. Use the upper left corner of the plan sheet border to place the cell. This cells contents will need to be included for each plan sheet matrix. (Use the PE number in place of the r/w ID

until Federal funding has been approved establishing the r/w ID. The project number is shown as a combination of the control number and agreement number.) To save effort, place the cell once, fill in all the information, and then copy it to the other sheet matrix positions.

12. Use the “Drop Complex Status” command on each “mtpldf” cell after every sheet matrix is complete.

13. All strip map reference files need to be clipped using the purple outline located on level 63 as a guide. Your clip line may vary from the purple outline to avoid clipping a centerline station in half or to clip at an angle perpendicular to the centerline in a curve.

14. Clip bind the road design plan sheet at the orange outline located on level 62. Where the begin or end notes are shown, adjust the fence to clip off the leader lines designating information included in the profile view.

15. Reference the r/w strip map file one (1) time for each sheet matrix used. Use logical names “romap1”, “romap2”, “romap3”. The r/w strip maps must be positioned and clipped exactly as the other strip maps for each file that needs to be attached.

16. Attach the data field cell named “mtown5” if and when needed.

17. The levels should be turned on or off in the reference files, as specified below. This does depend on proper design by the R/W Designer and Road Designer:

    a. Active Design Plane:

       Turn OFF - 9 or 10 (Scale), 62, 63

    b. R/W Strip Map (“romap1”, “romap2”, “romap3”):

       Turn ON - *3, *4, 16, *25, *26, 30, 31, *33, 34, 35, 36, 38, 39, & 40

    c. RD Strip Map (“rdmap1”, “rdmap2”, “rdmap3”):

       Turn ON - *3, *4, 7, 11, 13-15, 20-22, 33, *33, 44, 47-49

    d. RD Plan Sheet (“rdpln1”, “rdpln2”, “rdpln3”):

       Turn ON - 3

**Note: Depends on whether r/w is being designed using copied preliminary construction limits or final Road Design construction limits.*

18. Send files to DMS (Document Management System).

22-1.2.3 Title Sheet

Create the title sheet using the following procedures:

1. Open MicroStation to the “MicroStation Manager” dialog window.

2. Create a new file (“File”, “New”). In the “Create Design File” window, use the select button to choose the “seedm.dgn” file. It is a two-dimensional metric design file with a Global Origin of 0, 0. Enter the title sheet file name following the standard naming convention: “_ _ _ _ROTTL001.dgn”.

3. Open the new r/w title sheet file.

4. Attach the r/w standard title sheet border: “MTROSTD:METRWTI.REF”. Use logical name “sht”. Turn off level 40: “Level Information List”. If this reference file does not reference in the appropriate area, you may have to move and perhaps scale the reference file to appear correctly.

5. Attach the road design title sheet file. Use logical name “rdttl”. If the road design title sheet file comes in at the location of the third file matrix, the reference file must be moved to the first (bottom) sheet matrix.

6. The project location arrow from the road design title sheet needs to be copied. Turn off level 5 (“State Map”) of the “sht” reference file. Place a fence around the location arrow and “THIS PROJECT” text. Copy the fence contents to the same location. Turn level 5 back on.

7. Attach the title sheet data field cell “mttidf” from the “RWMET.CEL” library and fill in as much information as possible in the data fields including the r/w ID, designation, project no., sheet nos., project length, County, associated project agreement no. (see Item a.), related project nos. (see Item b.), etc. Use the upper left corner of the title sheet border to place the cell. Use the PE number in place of the r/w ID until Federal funding has been approved establishing the r/w ID. The project number is shown as a combination of the control number and agreement number. Project and agreement numbers are defined as follows:

a. Associated Project Agreement Number. Usually, the PE number of the project.

b. Related Project Number. The project numbers of all existing r/w plans used to place the existing r/w.

8. Move the “rdttl” reference file to best fit the “County Location Map” and “Begin/End Project” text contents within the purple dashed boundary line on level 63 (“Tools”, “Move”). Additional information may need to be added to the “County Location Map” such as section numbers for each section the project roadway enters, township and range indication, town names main roadways lead to, etc.

9. Turn all active levels on. Turn off active level 63. In the “sht” reference file, turn off levels 9, 32, 33, 40, 41, & 43 (if not a limited access project).

10. Send file to DMS (Document Management System).

22-1.2.4 Ownership Sheet

The ownership sheet is placed after the title sheet within the r/w plan set. It consists of ownership names, addresses and areas. Ownerships can be placed at the top of the plan sheets or on a separate ownership sheet. If there are more than five total ownerships on the project, they should be shown on an ownership sheet. Create the ownership sheet as follows:

1. Save a plan sheet file as an ownership file following the standard naming convention: “_ _ _ _ROOWN001.dgn”.

2. Detach all the reference files except “MTROSTD:METRWPL.REF” (“sht”) and “MTRDSTD:PLANM.REF” (“sht1”).

3. Delete all active elements inside the yellow plan sheet border. Do not delete the information in the upper right and lower right corners of the border.

4. To display the ownership table, turn on levels 4 and 21-32 as necessary in the “MTROSTD:METRWPL.REF” (“sht”) reference file.

5. Attach data field cell “mtown” or “mtown5” from the “RWMET.CEL” library. Use the upper left corner of the title sheet border to place the “mtown” cell. Use the upper left corner of each group of 5 table lines to place the “mtown5” cell.

6. To place the “ASCII Files” note, use cell “crdgpk”. Place at the upper right corner of the sheet border.

7. If this is a state plane coordinate project, place cell “spcnot” in the lower left portion of the sheet.

8. Send file to DMS (Document Management System).

22-1.2.5 Area File

This file should be used for calculation of all areas. It provides a record of how the areas were calculated and shading shown on exhibits. Create the area file as follows:

1. Save the r/w strip map file as the area file following the standard naming convention: “_ _ _ _ROARE001.dgn”.

2. Delete all the active elements in the file. You can use the “Fence Delete” command or “Select All” from the “Edit” menu, then delete.

3. Reference the strip map file back in. Use the logical name “romap”.

22-1.2.6 Creating Areas

Area shapes need to be made for each parcel for the net r/w, existing easement, construction permit and easement areas. It is beneficial to put the net r/w and existing easement area shapes on a level that corresponds with the parcel number shown as two different colors. Construction permit areas should all be put on an unused level that does not correspond to any parcel number. This applies for easement areas as well. If you are unable to show the appropriate shading on the exhibit, you will have to adjust the levels. Create areas using the following procedures:

1. Use the “Fence” command to copy the lines making up the border of the area to a workable location.

2. Delete unnecessary elements and modify the lines using the “Extend Two Elements to Intersection” and/or “Extend Element to Intersection” commands to create a border.

3. Create a complex shape. Use the “Create Complex Shape” command. The fill type must be “Opaque” and the fill color used must be “Color 32-47”.

4. Move the shape to its exact original position using tentative snap. The “Use Fence” option should not be selected. Delete all additional elements within the fence that may have been copied in Step 1.

5. The area shapes created in the area file are used to provide area calculations for the ownership sheet. Use the “Measure Area” command. The method should be “Element” (do not use “Flood”).

6. Repeat steps 1 thru 5 for each area to be created.

7. Send file to DMS (Document Management System).

22-1.2.7 Master Exhibit Files

Create master exhibit files as follows:

1. Save the r/w plan sheet file as an exhibit file following the standard naming convention: “_ _ _ _ROEXH001.dgn”.

2. Delete all the active elements in the file. You can use the “Fence Delete” command or “Select All” from the “Edit” menu, then delete.

3. Reference the plan sheet file back in. Use the logical name “ropln”.

4. To display the proper exhibit sheet border, detach the reference file “MTROSTD:METRWPL.REF” and attach “MTROSTD:MDEED2.REF”. Use logical name “sht”. This exhibit sheet border is used in most standard situations. In the event there is a need to use another method “MTROSTD:MDEEDLL.REF” or “MTROSTD:MDEEDUL.REF” are also available. Experiment with their use.

5. Place the exhibit data field cell “exhdf” from the “RWMET.CEL” library. Use the lower right corner of the exhibit sheet border to place the cell. This cell will need to be placed for each exhibit sheet matrix.

6. All levels containing elements not shown on an exhibit will need to be turned off such as construction limits, topography, construction permits and callouts, road approaches, etc. A list of all information that will need to be shown is as follows:

    a. r/w ID number;

    b. project control number;

    c. designation;

d. section and quarter sections; US Government Lots, patented mineral survey numbers, Indian and/or tribal allotment numbers; homestead entry survey numbers; certificate of surveys; and lot, block and subdivision text;

e. north arrow, township and range;

f. Centerline data, which includes highway survey stationing and bearing;

g. curve data – simple curve: PI/angle/radius/length/tangent; spiral curve: PI/angle/radius/length/tangent/angle of spiral curve/length of spiral;

h. new right-of-way line, including highway survey station breaks with dimensions;

i. existing right-of-way or easement lines with width dimensioned;

j. railroad right-of-way including width; (railroad centerline should not be shown; railroad stationing only shows on the railroad exhibits, so be sure it is on a level in the strip map file that can be turned off.);

k. access control line and symbology, including highway survey station breaks and dimensions; road approach box should be shown on exhibits. (This only applies for access control projects.);

l. ownership lines and property boundary symbology; a series of dots along the inside of the property lines;

m. parcel numbers;

n. section corner ties; text containing XY coordinates or a bearing and distance from a property controlling corner;

o. proper exhibit border; and

p. waterways, irrigation canals, county road and street names; (occasionally, a lake, river or stream may need to be copied into the active file if the project affects it.)

7. Reference the area file one (1) time for each sheet matrix used. Use logical names “roare1”, “roare2”, “roare3”. The area files must be positioned and clipped exactly as the other strip maps.

8. Update the reference file sequence. From the “Reference File” window, select “Settings”, “Update Sequence”. Choose all area reference files “roare1”, “roare2”, “roare3” and move them to the beginning to update first.

9. Turn off all area reference file levels.

10. Adjust the color overrides to show the area file shading grey scale. Within the “Level Manager” window, change the “Symbology” toggle to “Override”. Highlight all area reference files and levels within them. Click in the color column and choose color 252.

11. To activate the color overrides, choose “Settings”, “View Attributes”. Apply the “Level Symbology” option.

12. Repeat one (1) time for each plan sheet file.

13. Send files to DMS (Document Management System).

22-1.2.8 Parcel Exhibit Files

Final exhibit parcel files showing parcel specific information must be created for each type of acquisition to correspond with the deed/easement form. Process parcel exhibit files as follows:

1. Open the appropriate master exhibit file. Select “File”, “Save As” to save a new file as the parcel exhibit file. There is not a standard naming requirement for the parcel files, however, it is a good idea to use a name similar to your master exhibit file that identifies the type of acquisition if not r/w such as: ”_ _ _ _roexh001_p1.dgn” or “_ _ _ _roexh001_p1-irease.dgn” for an irrigation easement, etc. See Section 25-3.1 — Saving Deeds and Exhibits for storing the parcel exhibit files.

2. Adjust the area reference file levels to display the appropriate shading.

3. Fill in the proper parcel and sheet numbers in the lower right portion of the exhibit sheet(s) using the “Fill in Single Enter-Data Field” command. Fill in the “Date Prepared” as it applies.

4. Place any additional parcel specific information in this file such as a tract of land description, extra section ties, easement hatching lines, DNRC or Railroad exhibit requirements, etc. See Section 25-1.1 — Parcel Exhibits and/or Section 25-4 — Deed and Exhibit Special Requirements for further explanation.

22-2 MISCELLANEOUS MICROSTATION V8 CADD PROCEDURES

22-2.1 Placing a Cell

Cells are utilized to eliminate time and effort spent creating repetitive elements and to maintain a consistent appearance of plan sheets. Use the following procedures when placing cells:

1. Select “Element” from the main toolbar, then “Cells”.

2. The “RWMET.CEL” library will need to be used for r/w cells. To attach the correct library, choose “File”, “Attach” from the cell library display box. The path for the cell library is as follows: “w:\rostd\cell\rwmet.cel”.

3. Choose the appropriate cell by double clicking on the cell of choice or highlight it, select the “Placement” button, and then choose the “Place Active Cell” command from the main toolbar.

4. The active angle and/or scale may need to be adjusted as necessary in the place active cell command box. Various cells need to be rotated perpendicular to the centerline such as r/w, construction permit, easement, begin/end acquisition callouts, etc.

5. Data point in the file to place the cell, then reset to clear the cell. Some cell origins are positioned for using the plan sheet border lines as the cell placement point.

22-2.2 View Hidden Data Fields

Many r/w cells partially or completely contain data fields. The data fields can be manipulated but are invisible unless a setting is changed. Use the following procedures when viewing hidden data fields:

1. Select “Settings” from the main toolbar, then “View Attributes”.

2. In the “View Attributes” window toggle on “Data Fields”, and then “Apply”. The data fields should be visible. The data fields will appear on the plan sheet if printed; therefore, the data fields option should be turned off before exiting or printing the file.

22-2.3 File Referencing

Various CADD files are attached to the r/w design files on a regular basis. This allows frequent changes in other files to be available effortlessly. Use the following procedure to reference files:

1. To reference another design file into a specific file using the “Key-In” command window, type “rf=mtro:”, “rf=mtrd:”, “rf=mtsu:”, etc., then the reference file name. The file must be on the computer hard drive for this to work properly. Example: “rf=mtro:1234romap001.dgn”.

2. The “Attach Reference File” command window will appear. Enter the appropriate logical name, then “OK”; or

3. Using the “Reference Files” window (“File”, “Reference”). Select “Tools”, “Attach”. Choose the reference file.

4. The “Attach Reference File” command window will appear. Enter the appropriate logical name, then “OK”.

5. The correct prefix must be added. Double click on the reference file within the “Reference Files” window. Enter “mtro:”, “mtrd:”, “mtsu:”, etc., as applicable for the prefix.

22-2.4 Move and Scale Reference Files

Occasionally, a reference file will attach at a peculiar location or even at the wrong scale. It may need to be moved and/or scaled. Use the following procedures:

1. To scale a reference file:

    a. Open the “Reference Files” window (“File”, “Reference”). Choose the reference file to be scaled.

    b. Select “Tools”, “Scale”. Adjust the scale in the “Scale Reference File” window larger or smaller as appropriate.

    c. Data point in the MicroStation file window at a point to scale the file about, then reset.

2. To move a reference file:

a. Open the “Reference Files” window (“File”, “Reference”). Choose the reference file to be moved.

b. Select “Tools”, “Move”.

c. Data point in the MicroStation file window at a point to move the reference file by. Data point again at the point to move the reference file to, then reset.

22-2.5 Grey Scale Levels

It may be necessary to grey scale particular information such as topography if the design area becomes too occupied. It helps to distinguish essential features of a plan from important but less significant features. Use the following procedures to grey scale:

1. Open the “Level Manager” window (“Settings”, “Level”, “Manager”).

2. Change the “Symbology” toggle to “Override”.

3. Highlight the file(s) containing information to be grey scaled and the appropriate levels.

4. Data point on the color column and select a color within the third row of the color table (32-47), then “OK”.

5. To activate the color overrides, choose “Settings”, “View Attributes”. Apply the “Level Symbology” option. To deactivate the color overrides, simply turn off the “Level Symbology” option applied in this step.

22-2.6 Apply Hatching or Cross Hatching

New r/w designed on Federal Government Land is shown with hatching. New r/w and existing r/w-easement on Indian land is designated with cross-hatching. Use the following procedures:

1. For an area with the perimeter consisting of straight lines:

   a. Set the element attributes to the correct level and line weight, style and color.

   b. Choose the “Hatch Area” or “Crosshatch Area” tool.

c. Select the method “Points” and set applicable parameters.

d. Tentative snap at each line end point around the area perimeter, then reset when complete. The crosshatch or hatch lines should be in place.

2. For an area with the perimeter containing curved lines:

a. Use the “Fence” command to copy the lines making up the border of the area to be hatched or crosshatched to a workable location.

b. Delete unnecessary elements and modify the lines using the “Extend Two Elements to Intersection” and/or “Extend Element to Intersection” commands to create a border.

c. Create a complex shape. Use the “Create Complex Shape” command. The fill type must be none.

d. Move the shape to its exact original position using tentative snap. The “Use Fence” option should not be selected. Delete all additional elements within the fence that were copied in Step 1.

e. Choose the “Hatch Area” or “Crosshatch Area” tool.

f. Select the “Method Element” and set applicable parameters, then data point on the shape twice. The crosshatch or hatch lines should be in place.

g. Delete the complex shape border.

22-2.7 Place Ownership Dots

Ownership dots are placed as a line style along property boundaries as applicable. See Section 23-4.2.1 for additional information on ownership dots. Use the following procedures:

1. With the “Move Parallel” command, copy the property line as applicable to the inside of each property boundary 5 ft (1.5 m).

2. Change the copied line element attributes to the correct level (34), line weight (5), style (1) and color for ownership dots using the “Change Element Attributes” command. (See Section 22-4 Standard Element Attributes.)

3. Use the “Extend Two Elements to Intersection” command to clip the ownership dots at each corner.

22-2.8 Use Cell as Linear Pattern

Rather than repetitively placing a cell such as the access control symbols, this procedure saves time and is more effective:

1. Copy the line to be shown with the repeated cell at the same position or parallel 4 ft (1.25 m) if placing existing access control.

2. Revise the element attributes of the copied line appropriately. See Section 22-3 — R/W Level Assignments)

3. Choose the “Linear Pattern” command. Adjust the cycle to “Truncated”. Enter the pattern cell. Adjust the scale as necessary. Tolerance is 0.

4. Select the copied line. The line should now be a repetitive series of the chosen cell.

22-2.9 Remove Fence Lock

Use the following procedure to remove fence lock:

1. Choose “Select All” from the “Edit” menu.

2. Choose “Unlock” from the “Edit” menu.

3. To unselect all items, choose “Select None” from the “Edit” menu.

22-3 R/W LEVEL ASSIGNMENTS

Figure 22-1 shows the level assignments that should be used when developing r/w CADD files.

LEVEL	CELL	PLAN SHEET FILES	STRIP MAP FILE	EXHIBIT PARCEL FILE
1	NAR VALUES	North Arrow		DNRC Conversions & Note
2	OMTSHT	Omit Sheet Note – title sheet		
3		Archive Note – plan & title sheets	Copied RD Final Alignment	
4	OWNBLK	Short Form Ownership Block	Copied RD Final Centerline Text	
5				
6	MTPLDF	R/W ID, Designation & County Name		
7	MTOWN, MTOWN5	Ownership Enter Data Fields & Notes		
8	MTPLFD	File Name – lower right corner all sheets		
9	MTPLDF	Sheet Numbers – upper right corner		
10	MTPLDF	Sheet Scale – lower right corner		
11	MTPLDF	Sheet Bar Scale – lower right corner		
12	MTPLDF, PRCLNM, EXHDF	Revision Dates – lower right corner		Parcel Sheet Nos., Exhibit Data Fields
13				
14				
* 15	CORTIE, QTRTIE	Section Tie Note		
16		**LEAVE OPEN**	Section Lines (tied/not tied) Section Corners (found/unfound)	

R/W CADD LEVEL ASSIGNMENTS

Figure 22-1

	LEVEL	CELL	PLAN SHEET FILES	STRIP MAP FILE	EXHIBIT PARCEL FILE
*	17	TRCAL	Township & Range Calls on Township & Range Lines		
	18				
	19	QTRCAL, LOTCAL	1/16 Section Calls & US Government Lot Calls		
	20	SPCNOT	State Plane Coordinate Note		
	21	EXRW, OWNBLK	Existing R/W Retracement Note Short Form Ownership Block		
	22				
*	23		RR R/W Stationing		
	24	STBLK NFSL, USFS, BDNRCR, BDNRCL, EDNRCR, EDNRCL	State Land Area Block, Forest Service & Nat'l Forest System Calls		Begin/End DNRC Callouts
	25	PRCL1-9 TRACT	Parcel Numbers	Copied RD Preliminary Align. & CL text	Tract of Land Description
	26	TIE	Ownership Tie	Copied RD Preliminary Const. Limits	
*	27		RR R/W Dimensions & Railroad Names		
*	28		Existing R/W & Easement Dimensions		
*	29	OLDES	Existing R/W & Easement Calls		
	30	RWMON	LEAVE OPEN	Existing R/W, Easement, County Road Lines, & Existing R/W Monument Cells	
	31			Proposed R/W and Easement Lines	
*	32	RWLCAL, RWRCAL, EASEBL, EASEBR EASEEL, EASEER RWLOPN, RWROPN	New R/W & Easement Calls, Centerline Extenders		

R/W CADD LEVEL ASSIGNMENTS

Figure 22-1 (continued)

	LEVEL	CELL	PLAN SHEET FILES	STRIP MAP FILE	EXHIBIT PARCEL FILE
	33	PLUSLT, PLUSRT	R/W +00 Offset Calls – at Sheet End Station	Copied Final Road Design Const. Limits	
	34		Ownership Dots	Property Lines	
	35		**LEAVE OPEN**	Interior Section Lines (1/16th)	
	36			Construction Permit Lines	
*	37	CPBEGL, CPBEGR CPENDL, CPENDR CONPMT	Construction Permit Calls & Dimensions		
	38		**LEAVE OPEN**	Proposed Easement Lines	
	39	PCF	Other Easement Text	Found Property Corner	
	40		**LEAVE OPEN**	Existing RR R/W Lines	
	41				
	42	EAC	Existing Access Control Symbol		
*	43	LAC, FAC APPFR2, AC1, AC2	Access Control Symbols, Resolution & Approach Frame		
*	44	BEGACQ ENDACQ	Begin and End Acquisition Note		
	45		Lot, Block, & COS Numbers, City Limit Text, etc.		
	46		Town Names		
	47		Project Number		
	48	CRDGPK	ACSII Note – Ownership Sheet FEDERAL AID PROJECT – title sheet		
	49		Forest Service Additional Info.		
	50		Hatch Lines for Government Lands		

R/W CADD LEVEL ASSIGNMENTS

Figure 22-1 (continued)

LEVEL	CELL	PLAN SHEET FILES	STRIP MAP FILE	EXHIBIT PARCEL FILE
51		X-Hatch Lines for Indian Lands, Allot. Nos., Reservation Names & Boundaries		
* 52		County Road Names and County Line Labels		
53				
54				
55				
56				
57				
58				
59				
60				
61	SEAL			James A. Walther Signature Block
62	MTPLDF	Clip Bound Line for Road Design Plan Sheets – ORANGE		
63	MTPLDF FSSIGN	Clip Bound Line for Strip Maps – PURPLE		USFS Engineer Signature

* *Note: Information contained on these levels is to be placed within the Orange Clip Boundary Line for Road Design Plan Sheets (Level 62).*

R/W CADD LEVEL ASSIGNMENTS

Figure 22-1 (continued)

22-4 R/W STANDARD ELEMENT ATTRIBUTES

Figure 22-2 shows the attributes that should be used as standards for developing r/w plan sheets and r/w strip map CADD files.

DESCRIPTION	FILE	LEVEL	COLOR	STYLE	WEIGHT
Existing R/W Lines	Strip Map	30	-	0	1
Property Lines	Strip Map	34	-	0	1
Ownership Dots	Plan Sheets	34	-	1	5
Proposed R/W Lines	Strip Map	31	-	7	3
Section Lines (Surveyed)	Strip Map	16	2 Green	3	2
Section Lines (Not Surveyed)	Strip Map	16	0 White	3	2
Interior Section Lines (16^{th})	Strip Map	35	0 White	3	2
Existing Railroad R/W Lines	Strip Map	40	-	6	2
Proposed Easement Lines	Strip Map	31 or 38	-	0	3
Proposed Const. Permit Lines	Strip Map	36	-	0	3
Federal Government Land Hatching (Spacing: 50 ft (15 m); Angle: 45)	Plan Sheet	50	-	0	0
Indian Land Crosshatching (Spacing: 50 ft (15 m), 50 ft (15 m); Angle: 45, -45)	Plan Sheet	51	-	0	0

R/W STANDARD CADD ELEMENT ATTRIBUTES

Figure 22-2

22-5 R/W STANDARD REFERENCE FILES

The following are the standard reference files that should be used when developing r/w CADD files:

1. METRWPL.REF. Standard r/w plan sheet, no border. See the ***MDT CADD Standards Manual*** for the level symbology associated with this reference file.

2. PLANM.REF. This is the shared road design file from ROSTD that is used to build the border in the r/w plan sheets. See the ***MDT CADD Standards Manual*** for the level symbology associated with this reference file.

3. METRWTI.REF. Standard r/w title sheet. See the ***MDT CADD Standards Manual*** for the level symbology associated with this reference file.

4. MDEED2.REF. Standard exhibit sheet, with title block in lower right corner, which is used generally.

5. MDEEDLL.REF. Standard exhibit sheet, with title block in lower left corner. Use if the drawing covers the standard placed title block area.

6. MDEEDUL.REF. Standard exhibit sheet, with title block in upper left corner. Use if the other blocks interfere with drawing.

22-6 PREFERRED R/W PLAN ABBREVIATIONS

Figure 22-3 shows the abbreviations for terms that are preferred when developing r/w plan sheets.

TERM	ABBREVIATION
Acre	(AC for ownership sheet)
Aluminum Monument	ALUM. MON.
Aluminum Cap	A.C.
Angle Point	A.P.
Avenue	AVE.
Bearing	BRG.
Boulevard	BLVD.
Brass Cap	B.C.
Bureau of Land Management	B.L.M.
Centerline	C/L
Centimeter	Cm
Certificate of Survey	COS
Chain	ch.
Closing Corner	C.C.
Combination Scale Factor	C.S.F.
Concrete	CONC.
Construction Permit	CONST. PMT.
Corner	COR.
County	CO.
Creek	CR.
Curve to Spiral	C.S.
Degree	°
Description	DESC.
Easement	EASE.
East	E
Existing	EX.
Foot	ft. or (‘ for English plan sheets)
Found	FD. or FND

PREFERRED R/W PLAN ABBREVIATIONS

Figure 22-3

TERM	ABBREVIATION
General Land Office	G.L.O.
Hectare	Ha
Highway	HWY.
Inch	in. or ”
Incorporated	INC.
Kilometer	Km
Left	LT.
Meter	M
Mile	mi.
Millimeter	Mm
Montana Department of Transportation	MDT
Monument	MON.
North	N
Number	NO.
Point of Curve (Beginning)	P.C. (section tie)
Point of Tangent (End of Curve)	P.T. (section tie)
Point on Tangent	P.O.T. (section tie)
Present Traveled Way	P.T.W.
Property Line	P.L. or PROP. LINE
Railroad	R.R.
Range	R
Reference Point	R.P.
Record	REC.
Reference	REF.
Reference Monument	R.M.
Reference Point	R.P.
Right	RT.
Right-of-Way	R/W
River	RIV.
Road	RD.
Route	RTE.
Section	SEC.

PREFERRED R/W PLAN ABBREVIATIONS

Figure 22-3 (continued)

TERM	ABBREVIATION
Section Line	SEC. LINE
South	S
Spiral to Curve	S.C.
Spiral to Tangent	S.T.
Square Feet	(SF for ownership sheet) or (sq. ft. for deeds)
Square Meter	m^2
Station	STA.
Street	ST.
Subdivision	SUBD.
Survey	SURV.
Tangent to Spiral	T.S.
Temporary	TEMP.
Township	T
Tract	TR.
U.S. Bureau of Land Management	B.L.M.
U.S. Forest Service	USFS
U.S. Government Lot	U.S. GOVT. LOT
West	W
Witness Corner	W.C.

Note: There may be additional abbreviations not included on this list.

PREFERRED R/W PLAN ABBREVIATIONS

Figure 22-3 (continued)